UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/065,486	10/23/2002	Tin-Su Pan	124695	7326

23413 7590 04/06/2007

CANTOR COLBURN, LLP
55 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

EXAMINER	
LAMPRECHT, JOEL	
ART UNIT	**PAPER NUMBER**
3737	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/06/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

ED

Office Action Summary	Application No.	Applicant(s)	
	10/065,486	PAN ET AL.	
	Examiner	Art Unit	
	Joel M. Lamprecht	3737	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Applicant's arguments filed 2/22/07 have been fully considered but they are not persuasive. The previous rejection follows. The Examiner respectfully disagrees with Applicant. The arguments and amendments have been fully considered and found to further limit the application slightly, however under the broadest reasonable interpretation in light of the specification the claims are not in condition for allowance. The Examiner offers the following explanation:

The art of record currently reads on the Applicants Claims as written (even in light of the specification) because the claimed sub-target areas form the specification are disclosed quite broadly,

From the specification:

"Knowing the area of interest, at process block 204 the area of interest is subdivided in the Z-axis (in this embodiment the patient table direction) into multiples of detector coverage in Z. For example, if there is 6cm of the area of interest in the Z direction, and the detector coverage in that axis is only 2 cm, data is acquired with---3 consecutive locations, with each location covering 2 cm."

If Applicant is attempting to act as their own lexicographer and define "detector coverage" as a specific size or shape, the Examiner asserts that Applicant should have

written a more limiting definition of "Detector Coverage" into the specification, or foregone the useage of the term in the proposed amendment.

Furthermore, the Examiner understands the argument that pixelation creates a number or plurality of small target regions, but the idea and concept that is inherent within pixelation as an imaging technique is that any image which has been pixilated is ready for immediate "sub-target area" analysis by nature of pixel numerization.

From the Definition of Pixel:

The basic unit of the composition of an image on a television screen, computer monitor, or similar display. -American Heritage Dictionary

The Examiner has used the most common definition of pixel within the context of imaging, that is the smallest chosen portion of an image, organized for processing. Within the organization that pixelation requires, a computer processes each individual pixel when performing a function or applying an algorythm. All that being said, the fact that the Barni reference uses pixels as a method of division does not prohibit selection of a larger element by nature of using multiple pixels or a region of pixels for registration. The stored information allows for very easy access to registration and processing of multiple picture elements at once. This is a reasonable assumption and is quite commonplace when attempting to match one image of a region to another image of the same region.

The definition of axis or axial as pertains to engineering would be any chosen direction in an image, as within engineering the selection of the coordinate system is simply a set of reules for specifying how coordinates are to be assigned to spatial or polar points.

Having detector coverage in an axial direction versus having detector coverage in a defined direction is relient on the datum set by the imaging system and selection of a specific coordinate system is dependent on the operator or designer of the system. Since there are no specific or limiting datum as per the specification, it would be anticipated and reasonable to assume that a defined direction as chosen by Barni for the subdivision of the image would have been an "axial" direction.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 3, 4, 6, 7, 9, 11-15, 21, 24, 26, 27 and 29 are rejected under 35 U.S.C. 102(e) as being anticipated by Barni (U.S. Patent No. 6,473,634).

3. Barni teaches a method and system for registering images of a patient using retrospective gating including determining a target area (col. 2 line 10-13), obtaining scout image data of the target area (abstract), processing the target area to create a plurality of sub-target areas of interest (col. 3, lines 51-54), where multiples of the increments are equally dimensioned (2d, 3d, as per Col 3-4) computing a desired acquisition time having a duration greater than the duration of a breathing cycle of the patient (col. 1 line 58- col. 2 line 12), imaging each sub-target area, combining the sub-

target area image data to create a set of image data (col. 3 line 11-30), processing the image data set to determine a phase and synchronizing the phase (col 4 line 25 – line 41), where the target area of interest corresponds to a size of a target and is associated with an object to be imaged (col. 6 line 42-64) , where the set of image data corresponds to the target area of interest (col. 5 line 12-60), where synchronizing the phase uses the phase to correlate image data (col. 4 line 25-41), where the system includes an imaging device (col. 1 line 16-24), a processing device and a storage medium with machine-readable computer program code (col. 3 line 40-58), and the reference further teaches a method of assigning phases in an image by imaging an object to create image data and system data (col. 4 line 25-41), where the system data includes physiological information, that is respiratory cycle data (col. 4 line 35-36), and the imaging system information corresponds to each respiratory cycle (col. 4 line 30-36) (also see figures 1-4).

4. The Examiner has interpreted Claim 21 as means plus function language, thus invoking the sixth paragraph of 35 U.S.C. 112, and the Examiner has looked to the specification for a description of the structure claimed. Although Barni does not provide the exact structure described in the specification, it is a functional equivalent because it serves the same purpose of determining target areas and sub-target areas of interest, imaging the areas, combining and processing the image data and synchronizing the data, and it achieves the same result of registering images of a patient using retrospective gating.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 2, 5, 10, 16 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barni in view of General Electric Company (European Patent Application No. 1090586) (hereinafter "EP 1090586").

Barni teaches all of the features of the present invention except for expressly disclosing that the size of the sub-target area corresponds to a size of a detector in a selected axis and that the acquisition time corresponds to a physiological cycle plus at least one of two-thirds of a gantry rotation time or one rotation time. In the same field of endeavor, EP 1090586 teaches slices from a CT imaging device that correspond to the size of a detector on an axis (paras. 26 and 27 and clause 50). It would have been obvious to one of ordinary skill in the art at the time of the invention to subdivide the target area into sub-targets matching the size of the detectors when planning an imaging sequence in order to simplify the processing of the data collected. Although EP 1090586 does not explicitly teach an acquisition time of one physiological cycle plus two-thirds or one gantry rotation time, the reference does teach an asynchronous scan that offsets the gantry rotation and the physiological cycle (paras. 6 and 25). It would have been obvious to one of ordinary skill in the art at the time of the invention to use such an

acquisition time in order to ensure full coverage of the physiological cycle by the imaging device.

6. Claims 8, 17 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barni in view of Shao et al. (U.S. Patent Application Publication No. 2003/0233039).

7. Barni teaches all of the features of the present invention except for expressly disclosing that the PET emission data is synchronized with the phase. In the same field of endeavor, Shao et al. teaches matching PET data to the respiration phase of a subject being imaged (paras. 10, 48 and 68). It would have been obvious to one of ordinary skill in the art at the time of the invention to synchronize the PET data with the phase of Barni in order to improve the alignment of the images.

8. Claims 25 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barni in view of Hu et al. (U.S. Patent No. 6,073,041).

9. Barni teaches all of the features of the present invention, including determining a reference point in the data (col. 4, lines 66-67 and col. 5, lines 1-60), except for expressly disclosing that a phase of zero was assigned to the reference point and a phase of 2π was assigned to a subsequent reference point, where the synchronizing included selecting images' with corresponding phases and that the phase was adjusted when the reference point occurred when the imaging system was not active. In the same field of endeavor, Hu et al. teaches a system for retrospective gating of images using an assigned phase based on the respiratory cycle, where subsequent reference points were also assigned a phase, in order to register the images, where the phase

was adjusted when the reference point occurred when the imaging system was not active (col. 6, lines 58-67, col. 7, lines 1-67, col. 8, lines 1-56, col. 11, lines 10-67 and col. 12, lines 1- 14). Although the particular phase values of zero and 27: were not specifically taught, Hu et al. does teach periodic cycles, thus it would have been obvious to one of ordinary skill in the art at the time of the invention to have used such values to characterize the periodicity of the phases assigned.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joel M. Lamprecht whose telephone number is (571) 272-3250. The examiner can normally be reached on Monday-Friday 7:30AM-4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian L. Casler can be reached on (571)272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

3/22/07

JML

ELENI MANTIS MERCADER
SUPERVISORY PATENT EXAMINER